REMARKS

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claims 1-6, 8-14, 18, 21-23, 26, and 27 are currently being amended.

This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

After amending the claims as set forth above, claims 1-14, 17, 18, 21-23, and 25-32 are now pending in this application.

I. Interview Summary

Applicant thanks the Examiner for conducting the telephonic Interview on May 5, 2010. Participating in the Interview were Examiner Taylor and Applicant's prior representative, Daniel Bestor. During the Interview, Applicant and the Examiner discussed independent claim 1 of the present application in the context of the cited prior art references, U.S. Patent Publication No. 2002/0163929 (Li et al.) and "IEEE 802.11 Protocol: Design and Performance Evaluation of an Adaptive Backoff Mechanism" (Cali et al.) The Examiner was provided with a copy of independent claim 1 as amended above prior to the interview.[1]

First, Applicant argued that Cali et al. merely describes calculating wait times based on accesses to the shared medium by all stations in a network. The Examiner alleged that independent claim 1 was being construed broadly enough to read on such a disclosure.

Second, Applicant argued that Li et al. and Cali et al. are directed to calculating backoff windows, not backoff intervals, and that the backoff windows of Li et al. and Cali et al. cannot be construed to read upon the currently claimed average backoff interval because,

[1] Independent claims 8, 13, 18, and 22 of the present application have been similarly amended. Dependent claims 2-6, 9-12, 14, 21, 23, 26, and 27 were also amended for consistency and clarification purposes commensurate with the amendments to independent claims 1, 8, 13, 18, and 22 of the present application.

e.g., independent claim 1, explicitly recites "refraining from contending for access to [the] shared resource for at least an interval substantially equal to the first average backoff interval." In contrast, Li et al. and Cali et al., consistent with the IEEE specification at their time of publication, require that a backoff interval be randomly chosen within the backoff window and that transmissions take place at the determined random backoff interval within the backoff window.

The Examiner stated that he would have to take more time to review the references, and perhaps conduct a new search. No agreement was reached on allowability.

II. Claim Rejections – 35 U.S.C. § 103

In order to establish a *prima facie* case of obviousness under 35 U.S.C. § 103, the Examiner must provide evidence which as a whole shows that the legal determination sought to be proved (i.e., the reference teachings establish a *prima facie* case of obviousness) is more probable than not. *MPEP §2142 rev. 6* (October 2007).

KSR International Co. v. Teleflex Inc. requires that an Examiner provide "some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385, 1396 (2007). An Examiner must "identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does." *Id.* The mere fact that references can be combined or modified does not render the resultant combination obvious unless the results would have been predictable to one of ordinary skill in the art. *Id.* The Examiner must make "explicit" this rationale of "the apparent reason to combine the known elements in the fashion claimed," including a detailed explanation of "the effects of demands known to the design community or present in the marketplace" and "the background knowledge possessed by a person having ordinary skill in the art." *Id.* at 1389. The rationale must be free of the distortion caused by hindsight bias and may not rely on ex post reasoning. *Id.* at 1397. Anything less is not sufficient to sustain a *prima facie* case of obviousness. *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329 (Fed. Cir. 2006).

In light of the above, Applicant submits that the Examiner has failed to establish a *prima facie* case of obviousness for at least the reason that the references, alone or in combination, fail to teach each and every element recited in the claims of the present application. Furthermore, Applicant submits that the teachings of the cited prior art references have been mischaracterized/misinterpreted by the Examiner.

A. The Examiner has not established a prima facie case of obviousness with regard to claims 1, 2, 4-7, 13, 17, 22, 25, 28, and 30 of the present application in view of the cited prior art references because Li et al. and Cali et al., either separately or in combination with each other, fail to teach or suggest: "determining a first average backoff interval by measuring an average wait time that the first station incurred during a plurality of previous access attempts to the shared resource;" and "refraining from contending for access to the shared resource for at least an interval substantially equal to the first average backoff interval."

In the outstanding Office Action of March 16, 2010, claims 1, 2, 4-7, 13, 17, 22, 25, 28, and 30 of the present application were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Li et al. in view of Cali et al. Applicant traverses the rejection for the reasons set forth below.

With regard to independent claims 1, 13, and 22 of the present application, the Examiner asserted that Li et al. teaches each and every feature recited in these claims including: "determining a first average backoff interval by measuring an average wait time that the first station incurred during a plurality of previous access attempts to the shared resource;" and "refraining from contending for access to the shared resource for at least an internal substantially equal to the first average backoff interval." Applicant respectfully disagrees with the Examiner's position.

Li et al. is directed methods and systems "for data collision resolution wherein the same back-off window is sent to a plurality of remote users and is recalculated to maintain a constant collision rate and thereby increase throughput." (*See, e.g.*, Abstract of Li et al.) Li et al. further describes that "throughput is the amount of data transferred from one user to another user in a specified amount of time. In contention resolution algorithms, throughput is

often measured as a ratio of the number of successful transmissions to the total number of transmission opportunities." (*See, e.g.,* paragraph [0007] of Li et al.)

To support his position, the Examiner asserted that paragraphs [0014]-[0016], [0059]-[0064], and Figure 5 of Li et al. teach "determining a first average backoff interval by measuring an average wait time that the first station incurred during a plurality of previous access attempts to the shared resource," as required by independent claims 1, 13, and 22 of the present application. Paragraphs [0014]-[0016] recite the following:

> [0014] A system and method for data collision resolution wherein the same back-off window is sent to a plurality of remote users and is dynamically adjusted to maintain a collision rate and thereby enable improved throughput. In accordance with one embodiment, collision rate is estimated by detecting collisions in reservation slots and the size of the back-off window is adjusted to maintain a collision rate of approximately 1-2/e.
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> [0015] In accordance with an embodiment of the present invention, a method is disclosed wherein a first back-off window is sent to all users of a network, a second back-off window is calculated based on one or more operational characteristics of the network and the second back-off window is then sent to the users. An embodiment of the present invention further discloses a method of calculating the back-off window based on the collision rate of the system, and, in another embodiment, the back-off window is adjusted to maintain a constant collision rate of approximately 1-2/e. In still another embodiment of the present invention, the status of one or more reservation slots is used to estimate the collision rate of the system.
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> [0016] In accordance with another embodiment of the present invention, a method for collision resolution is disclosed wherein a common back-off window is sent to all users of a network and the back-off window is dynamically adjusted to maximize throughput. Another embodiment discloses dynamically adjusting the back-off window based on collision rate and, in another embodiment, the back-off window is adjusted to maintain a constant collision rate of approximately 1-2/e. In yet another embodiment, the back-off window size is adjusted to keep the number of users on the system approximately equal to the back-off window.

Figure 5 of Li et al. and its corresponding description at paragraphs [0059]-[0064] recite the following:

> [0059] When the reservation slot arrives, the reservation slot counter is incremented by one (Step 108) and a determination is made whether a collision occurred in the reservation slot. Multiple methods to detect collisions are known by those with ordinary skill in the art and an exhaustive review of those methods is beyond the scope of this document. In essence, if the access point 12 receives garbled data or data otherwise in error, FCR assumes a packet collision has occurred and increments the collision counter by one (Step 112).
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> [0060] The access point 12 does not broadcast a new back-off window until a sufficient number of reservation slots have been received to estimate the slot collision rate. In this embodiment, the history length of reservation is four; therefore, if the reservation counter has not reached four (Step 116), FCR returns to step 106 and waits for the next reservation slot to arrive. An exception to this rule occurs when the back-off window size is less than the history length of reservation (Step 114). In this embodiment, if the back-off window is less than four and the reservation counter is less than the back-off window, FCR returns to step 106 and waits for the next reservation (Step 118). When, however, the back-off window is less than four (Step 114) and the reservation counter equals the back-off window (Step 118), FCR estimates the slot collision rate, calculates a new back-off window (Step 120) and the access point 12 broadcasts the new back-off window.
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> [0061] FIG. 5 is a flow diagram that shows an illustrative method of the operation of FCR estimating the slot collision rate and using that estimate to calculate a new back-off window in accordance with an embodiment of the present invention. As already explained, the estimate and back-off window calculation (Step 130) occur when either: a) the reservation counter reaches the history length of reservation, or b) the back-off window is less than the history length of reservation and the reservation counter equals the back-off window.
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> [0062] In Step 132, FCR checks the size of the back-off window. A back-off window of one means that the access point 12 has received only one reservation slot since the last back-off window was broadcast. In Step 134, FCR checks the collision counter to see if a collision occurred in the single reservation

> slot that was received. If there was no collision, FCR proceeds to Step 200 and the access point 12 broadcasts the same back-off window (size one) to the wireless devices 14. If, on the other hand, there was a collision (collision counter equals two), FCR increases the back-off window to two (Step 136) and the access point 12 broadcasts the larger back-off window (Step 200).
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> [0063] If the back-off window is greater than one but less than four (Step 138), FCR proceeds to Step 140. At Step 140, the reservation slot counter has a value of either two or three and FCR checks the collision counter to determine how many collisions occurred in these slots. If zero collisions occurred, the back-off window is set to one (Step 142) and is broadcast (Step 200). If one collision occurred (Step 144), the back-off window is not changed and is re-broadcast (Step 200). Finally, if more than one collision occurred, the back-off window is set to four (Step 146) and is broadcast (Step 200).
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> [0064] In this embodiment, FCR reaches Step 148 when the size of the back-off window is greater than or equal to four (the history length of reservation). This means that four reservation slots have occurred since the last back-off window was broadcast. In Step 148, FCR checks the collision counter to determine how many collisions have occurred. If there have been no collisions, FCR decrements the size of the back-off window by 1 (Step 150) and broadcasts the smaller back-off window (Step 200). If a single collision occurred (Step 152), the back-off window is not changed and is re-broadcast (Step 200). Finally, if more than one collision occurred, the back-off window is incremented by 1 (Step 154) and is broadcast (Step 200).

First, Applicant submits that nothing in these sections of Li et al., nor anywhere else in Li et al., teaches or even remotely suggests "determining a first average backoff interval by measuring an average wait time that the first station incurred during a plurality of previous access attempts to the shared resource," as required in independent claims 1, 13, and 22 of the present application. As is clear from the above-noted sections of Li et al., the back-off window of Li et al. is calculated, for example, "based on the collision rate of the system, and, in another embodiment, the back-off window is adjusted to maintain a constant collision rate of approximately 1-2/e." (emphasis added). (*See, e.g.*, paragraph [0014] of Li et al.)

Moreover, the Examiner interpreted, and appears to continue to interpret the disclosure of Li et al. in the manner set forth at page 3 of the Final Office Action of November 10, 2009. That is and in the Examiner's opinion:

> A broadest reasonable interpretation of the claim term "average wait time" would include a measurement of network, throughput, as the successful transmission ration of the network would determine the amount of time that a station would have to wait for successful access.

In contrast to the Examiner's interpretation, paragraph [0007] of Li et al. is clear that "throughput is the amount of data transferred from one user to another user in a specified amount of time. In contention resolution algorithms, throughput is often measured as a ratio of the number of successful transmissions to the total number of transmission opportunities." Therefore, Applicant submits that Li et al. fails to teach "determining a first average backoff interval by measuring an average wait time that the first station incurred during a plurality of previous access attempts to the shared resource," as required in independent claims 1, 13, and 22 of the present application. Further still, Applicant submits that the Examiner's "broad interpretation" is simply not supported by the teachings of Li et al.

Second, Applicant notes that the Examiner continues to interpret the calculation of a "backoff window" as set forth in Li et al. as reading on the currently claimed "average backoff interval." However, as noted again during the Examiner Interview, the backoff window of Li et al. merely sets a range in which a station may randomly choose a backoff interval. For example, the operation of the backoff window is defined in paragraph [0011] of Li et al. as an interval in which, "if the transmitting user detects a collision, it re-transmits k slots later, where k is a random integer number uniformly distributed over the interval [1, 2.sup.i]. The interval over which the uniformly distributed number is drawn is hereafter referred to as the back-off window." (emphasis added).

In contrast, and as set forth in each of independent claims 1, 13, and 22 of the present application, the currently claimed average backoff interval relates to an interval during which the station "refrains from contending for access to the shared resource." (emphasis added). The two terms (backoff window and backoff interval) are directed to distinct medium access

attributes and are not interchangeable in the manner that the Examiner has asserted. Because Li et al. explicitly teaches re-transmitting during the back-off window, Applicant submits that Li et al. simply cannot be interpreted in any way to read on at least this feature of the independent claims of the present application. In fact, Applicant submits that Li et al. teaches away from independent claims 1, 13, and 22 of the present application for at least this reason.

The Examiner correctly recognized that "Li is silent as to measuring an average wait time that the first station incurred during a plurality of previous access attempts to the shared resource." However, the Examiner asserted that Cali et al. cures this deficiency of Li et al. Applicant respectfully disagrees with the Examiner's assertions.

First, Applicant submits that the Examiner has presented a contradictory position in that at, e.g., page 3 of the outstanding Office Action, the Examiner asserted (as discussed above), Li et al. teaches "determining a first backoff interval by measuring an average wait time that the first station incurred during a plurality of previous access attempts to the shared resource." Yet, at page 4 of the outstanding Office Action (as also noted above), the Examiner contradictorily indicated that "Li is silent as to measuring an average wait time that the first station incurred during a plurality of previous access attempts to the shared resource." Therefore, Applicant submits that the Examiner's rejection of independent claims 1, 13, and 22 of the present application is improper.

Second and notwithstanding the Examiner's contradictions, Applicant submits that Cali et al. fails to teach or suggest "measuring an average wait time that the first station incurred during a plurality of previous access attempts to the shared resource." That is, and as set forth on, e.g., page 1778, right paragraph, lines 17-19, Cali et al. teaches a station monitoring a wireless medium and calculating a moving average window of "average idle period length" and "average collision cost." However, neither of these values corresponds to an "average wait time that the first station incurred during a plurality of previous access attempts to the shared resource."

Moreover, Applicant submits that the alleged combination of Li et al. and Cali et al. (even if for the sake of argument, Cali et al. could be interpreted as teaching some average

wait time measurement), still would not arrive at the claimed embodiments disclosed in independent claims 1, 13, and 22 of the present application. That is, and in accordance with the Examiner's reasoning, Cali et al. would merely "provide the backoff interval calculation of Lai in the system of Li." However, and as already discussed above, providing a backoff interval with which to modify the systems and methods disclosed in Li et al., would merely result in Li et al. re-transmitting/transmitting during a backoff window, where the backoff window happens to be calculated in the manner suggested by Cali et al. Thus, Applicant submits that the alleged combination of Li et al. and Cali et al. would still fail to teach or suggest "refraining from contending for access to the shared resource for at least an internal substantially equal to the first average backoff interval."

In light of the above, Applicant submits that the Examiner has not establish a *prima facie* case of obviousness, and therefore respectfully requests that the Examiner's rejection of independent claims 1, 13, and 22 of the present application be withdrawn.

Because claims 2, 4-7, 17, 25, 28, and 30 of the present application are each dependent upon independent claims 1, 13, or 22 of the present application, Applicant further submits that the alleged combination of Li et al. and Cali et al. fail to teach each and every feature recited therein for at least the same reasons as already discussed above. Therefore and again, Applicant submits that the Examiner has not establish a *prima facie* case of obviousness, and therefore respectfully requests that the Examiner's rejection of independent claims 2, 4-7, 17, 25, 28, and 30 of the present application be withdrawn.

B. The Examiner has not established a prima facie case of obviousness with regard to claims 3, 8-12, 14, 18, 21, 23, 26, 27, 29, and 31 of the present application in view of the cited prior art references because Singh et al. cannot cure the deficiencies of Li et al., Cali et al.

In the outstanding Office Action of March 16, 2010, claims 3, 8-12, 14, 18, 21, 23, 26, 27, 29, and 31 of the present application were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Li et al., Cali et al., and further in view of "PAMAS – Power Aware Multi-Access Protocol with Signaling for Ad Hoc Networks" (Singh et al.) Applicant traverses the rejection for the reasons set forth below.

As set forth on pages 7-12 of the outstanding Office Action, the Examiner exclusively relied upon Li et al. and Cali et al. to allegedly establish a *prima facie* case of obviousness with respect to their respective base (independent) claims. For at least the same reasons as noted above, Applicant submits that Li et al. and Cali et al. fail to support a *prima facie* case of obviousness with regard to claims 3, 8-12, 14, 18, 21, 23, 26, 27, 29, and 31 of the present application.

Furthermore, Applicants submit that it is improper to combine Singh et al. with Li et al. and Cali et al. for at least the reason that these references teach away from any reasonable combination.

A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984). Furthermore, an obviousness rejection is improper if the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

In this instance, Li et al. and Cali et al. teach methods and systems that require a receiver to stay powered on in order to monitor the wireless medium and calculate/update an optimum backoff window. Accordingly, modifying Li et al. and Cali et al. in the manner asserted by the Examiner in view of Singh et al. (i.e., powering down the receiver when there are no frames to transmit) would render the alleged combination of Li et al. and Cali et al. unable to monitor the medium and modify the backoff window to optimize the efficiency of the protocol. Hence, Applicant submits that modifying Li et al. and Cali et al. in the manner asserted by the Examiner would, for the reasons enumerated above, result in the alleged combination of Li et al. and Cali et al. being modified unsatisfactorily for their intended purpose.

Further still, Applicant respectfully disagrees with the Examiner's characterization of the Singh disclosure as disclosing "IEEE 802.11 nodes [] power down when prevented from accessing the resource" set forth on page 7 of the outstanding Office Action. As set forth in

Section 2.1 of the Singh reference, "nodes transmit their requests to the base station during specific reservation intervals and the base station transmits a TIM (Traffic Indication map) that includes the transmission schedule for the nodes. All nodes not participating in transmission or reception of packets go into doze mode until the next reservation period." Accordingly, if a node has no pending data to send to the base station (i.e., no reservation request sent to the base station and thus the node is not participating in transmission of packets), and the base station has no pending data to send to the node (as indicated by the TIM), the node may go to sleep until the next reservation period. Such a disclosure is not equivalent to powering down a node during a backoff interval during which the station "refrain[s] from contending for access to the shared resource."

For at least these reasons as well, Applicant submits that the Examiner has failed to establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a), and that the Examiner's rejections of claims 3, 8-12, 14, 18, 21, 23, and 26-27 should be withdrawn.

III. Conclusion

Applicant submits that, for at least the foregoing reasons, all claims of the present application are patentable over the cited prior art. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by the credit card payment instructions in EFS-Web being incorrect or absent, resulting in a rejected or incorrect credit card transaction, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

Date June 8, 2010 By _____

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